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Original Research

"Honeycomb Pattern" Of Gall Bladder Wall Thickening -A Farward Step In Diagnosi Of Severe Dengue Fever

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Abstract

Background: Gall bladder wall thickening (GBWT) has been reported as one of the common findings in Dengue fever. Ultrasonography is noninvasive and easily available modality used in dengue patients.

Aim of the study: Ultrasonographic evaluation of Gall bladder wall thickness in Dengue fever.

Materials and methods: This was a prospective study done in the departments of radiology at Maheshwara medical college and hospital ,near Isnapur Isnapur,Patancheru ,Sangareddy, Telangana state over a period of one year from June 2018 to August 2019.

Results: Majority of the cases were present between 20-30 years (31.4%) followed by 28.5% among 31-40 years .Honeycomb pattern of gallbladder thickening was observed in in 24(68.5%) cases and a uniform echogenic pattern were present in 11(31.4%) cases .

Conclusion: Gall bladder wall thickening is important USG finding in diagnosed cases of DF. "Honeycomb" pattern of gallbladder wall thickening is significant finding in severe Dengue fever.

Keywords: Honeycomb" pattern, Dengue fever.

Introduction

Dengue fever, also known as breakbone fever, is a mosquito-borne infectious tropical disease caused by the dengue virus. This disease occurs primarily in the equatorial regions of Africa, the Americas, SouthEast Asia, and the Western Pacific.(1)

The incidence of dengue fever has increased dramatically since the 1960s,2 with current estimates of incidence ranging from 50 million2 to 528 million3 people infected yearly. This increase is believed to be due to several factors, including global warming and urbanization.(2)

Dengue is transmitted by several species of mosquito within the genus Aedes, principally Aedes aegypti (3) .Clinical course. The characteristic symptoms of dengue are sudden-onset

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fever, headache (typically located behind the eyes), muscle and joint pains, and a rash .(4) The alternative name for dengue, breakbone fever, comes from the associated muscle and joint pains.(5) .The hematological effects observed are changes in blood counts, hemoconcentration due to plasma leakage, leucopenia because of decreased neutrophils near the end of the febrile phase, presence of atypical lymphocytes and relative lymphocytosis before shock, thrombocytopenia and changes in blood hemostasis with frequent presence of hemorrhagic manifestations.(4)

Early diagnosis is necessary to reduce the mortality and morbidity associated with this disease; hence, a combination of clinical, laboratory, and sonography findings can be potentially helpful in making an early diagnosis of dengue fever [6,7].

Ultrasonography being noninvasive and easily available modality is being increasingly used in dengue patients. Gall bladder wall thickening (GBWT) has been reported as one of the common findings in DF.A thickened GB wall showing a “Honeycomb” pattern is almost a specific USG sign that may help in the early diagnosis, as well as in the prognosis, of DHF. The early abdominal USG finding of a diffusely much-thickened GB wall with a “Honeycomb pattern” in adult patients with DHF has never been described in the past. However, there is only one published report of GB wall thickening with a transient reticular pattern [8].A few recent studies have reported that ultrasound plays an important role as a prognostic indicator in assessing patients at risk for progressing to the critical phase by measuring GBWT [9,10,11].

Aim of the study

Ultrasonographic evaluation of Gall bladder wall thickness in Dengue fever.

Material and methods

Prior permission was taken from the Institutional Ethical committee. signed informed consent to participate was taken from all patients. This was a prospective study done in the departments of radiology at Maheshwara medical college and hospital ,near Isnapur, Patancheru, Sangareddy, Telangana state over a period of one year from June 2018 to August 2019. A total of 35 cases of dengue fever admitted in the wards under dept of General medicine were studied. The patients were labelled as belonging to either of the following categories: Classical Dengue Fever (DF) or Dengue Haemorrhagic fever (DHF) or Dengue shock syndrome (DSS).

Inclusion criteria

Patients willing to participate
Age group from 18 years to 60.
Both genders.
Patients with serologically confirmed IgM positive dengue fever
Patients with Thickened gall bladder on USG abdomen

Exclusion criteria

Patients not willing to participate
Age below 10 years and more than 60 years

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Pregnant women
Lactating women
Patients with Thickened gall bladder with non-dengue medical conditions

Methodology

All the cases that were dengue seropositive were selected. A thorough clinical history was taken. Local and systemic examination was done in all cases included in the study. All the routine investigations like complete blood count (Hematology autoanalyser Sysmex xs-800i), peripheral blood film for cell morphology, random blood sugar, complete urine analysis, Liver function tests (LFT) were done). Dengue IgM and IgG by ELISA was done in all the cases.USG Abdomen was performed on a GE LOGIQ C5, equipped with a 4C wide bandwidth (1.5 to 4.6MHz) convex probe and 11L wide bandwidth (4 to 12 MHz) linear probe. The abdominal ultrasound was done in all cases after 4 h of fasting for better visualization of the gall bladder (GB) and looked for thickened gall bladder . A much-thickened GB wall showing a "Honeycomb" pattern (Sachar and Sunder's sign) was defined as a confirmatory sign .A thickened GB wall was defined as being ≥3 mm and was measured by placing calipers between the two layers of anterior wall. GBWT was measured and the pattern of GBWT was assessed. The pattern of GBWT was correlated with the severity of disease. The severity of disease (DF without warning sign, DF with warning sign and severe DF) was assessed with the help of the "suggested dengue case classifications and levels of severity" proposed by WHO in 2009 [4].

The presence of ascites and pleural effusion were also looked for during the USG. Treatment was started in all patients based on USG findings.

Results and Observations

Table 1: Age distribution

Age distribution	**No. of cases**	**%**
10-20 years	04	11.4
20-30 years	11	31.4
31-40 years	10	28.5
41-50 years	06	17.1
51-60 years	04	11.4
Total	**35**	**99.9%**

In the present study age distribution varied from 10 years to 60 years .Majority of the cases were present between 20-30 years (31.4%) followed by 28.5% among 31-40 years.

Least cases were noted among 10-20 years and 51-60 years (each 11.4%). 17.1% constituted among 41-50 years

Table 2: Gender distribution

Gender distribution	**No. of cases**	**%**
Males	25	71.4
Females	10	28.5
Total	**35**	**99.9%**

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In the present study Males were predominantly presented with dengue infection (71.4%) when compared to females (28.5%).

Table 3: Clinical features

Clinical features	No. of cases	%
Only Fever	30	85.7
Fever with Myalgia	35	100
Myalgia + Headache	34	97.1
Nausea and vomiting	25	71.4
Skin rashes /Petechiae	25	71.4
Fever and pain in abdomen	25	71.4

The most frequent clinical features noted in the present study were fever with myalgia (100%), Myalgia + Headache (97.1%), Only Fever (85.7%),Nausea and vomiting, Skin rashes /Petechiae and Fever and pain in abdomen (71.4%)

Table 4: Classification of dengue

Classification of dengue	No. of cases	%
Dengue fever	10	28.5
Dengue haemorrhagic fever	12	34.2
Dengue shock syndrome	13	37.1
Total	35	99.8

Dengue shock syndrome was observed in 37.1% cases, Dengue haemorrhagic fever in 34.2%, Dengue fever in 28.5% cases.

Table 5: USG findings of Gall bladder(Thickness)

Clinical presentation	<3mm	>3mm	Total
Dengue fever	06 (17.1%)	04 (11.4%)	10(28.5%)
Dengue fever haemorrhagic fever	02(5.7%)	10(28.5%)	12(34,2%)
Dengue shock syndrome	03(8.5%)	10(28.5%)	13(37.1%)
Total	11(31.4%)	24(68.5%)	35(99.8%)

A uniform echogenic pattern were present in 11(31.4%) cases and honeycomb pattern in 24(68.5%) cases.Increased Thickness of Gall bladder was noted in Dengue shock syndrome which constituted about 37.1% .Increased GB wall thickness ranged between more than 3 and 12 mm.

Table 7: USG Findings of patients with positive Dengue serology

USG Findings	No. of cases	%
GB wall edema	11	31.4
Ascites	09	25.7
Splenomegaly	10	28.5
Pleural Effusion	05	14.2
Total	35	99.8%

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GB wall edema was observed in 31.4% cases, next common was Splenomegaly which constituted about 28.5%), Ascites(25.7%), Pleural Effusion(14.2%) .

Discussion

Comparative studies related to Age distribution

the present study age distribution varied from 10 years to 60 years .Majority of the cases were present between 21-30 years (31.4%) followed by 28.5% among 31-40 years. In **Vijayalakshmi et al study (12)** age group most commonly affected was 5-8 year followed by age group year 1-4 years and 9-12 years .In **Sudhir Sachar et al study (13)**majority were between 20 and 60 years with suspected DHF, n. **Jitendra Parmar et al study(14)**The mean ± standard deviation of age was 32.28 ± 15.0 years.

Comparative studies related to Sex distribution

In the present study males were predominantly presented with dengue infection (71.4%) when compared to females (28.5%) .In **Vijayalakshmiet al study (12)** A Male female ratio was 1.2. In **Falguni Parakh et al study (15)** 42 were women and 58 were men. In **Jitendra Parmar et al study (14)** 93 patients (60 (64.5%) males and 33 (35.5%) females. In **Harshavardhan Nagolu et al study (16)** male: female ratio was 1.46:1

Comparative studies related to Clinical features

In our study the most frequent clinical features noted in the present study were fever with myalgia (100%), Myalgia + Headache (97.1%), Only Fever (85.7%),Nausea and vomiting, Skin rashes /Petechiae and Fever and pain in abdomen (71.4%).In **Falguni Parakh et al study (15) a**ll patients had high-grade fever, but 46 patients also had chills. All the 100 patients had abdominal discomfort/upper abdominal pain. .In **Vijayalakshmiet al study (12)** Petechiae were found in most (17.9%) of the cases followed by malena (13.2%). In **Sudhir Sacharet al study (13)** all patients had high-grade fever, but only 10 patients also had chills. All the 20 patients had abdominal discomfort/upper abdominal pain.

Comparative studies related to Classification of dengue

Present study Dengue shock syndrome was observe din 37.1% cases , Dengue haemorrhagic fever in 34.2% , Dengue fever in 28.5% cases .In **Jitendra Parmar et al study (14)** out of 93 seropositive patients, 38 (40.8%) patients were classified as DF without warning signs, 26 (27.9%) patients as DF with warning signs and 29 (31.1%) as patients with severe DF.

Comparative studies related to USG findings and Thickness of GB

In our study A uniform echogenic pattern were present in 11(31.4%) cases and honeycomb pattern in 24(68.5%) cases.increased thickness of Gall bladder was noted in cases with dengue shock syndrome which constituted about 37.1% . In a study done by **Jitendra Parmar et al (14)** a uniform echogenic pattern were present in 20 (21.5%) patients, striated or tram track pattern in 11 (11.8) patients, asymmetric pattern in 2 (2.1%) patients and honeycomb pattern in 21 (22.5%) patients.In **Sudhir Sacharet al study (13)t**he most common emergency USG finding was a “Honeycomb-type” thickened GB wall in 19 patients (95%). The onion peel/laminated/multilayered GB wall thickening pattern was seen in 1

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patient only (5%).) The GB wall thickness ranged between 6 and 12 mm. Ascites was noted in 15 patients (75%). In **Vijayalakshmi** et al study (12) Gall bladder wall thickness measurement showed (40%) had thickness in range of 1.0-2 mm followed by (25.7%) in 2.1-3 mm range group. 18 cases had gall bladder wall thickness more than 5 mm. In **Jitendra Parmar et al study (14)**. GBWT was present in 54 cases of dengue fever on the day of presentation. In **Falguni Parakh et al study (15)** Out of 100 patients, 86 patients had edematous wall of Gall Bladder with the specific Honeycomb pattern

Comparative studies related to complications

In our study GB wall edema was observed in 31.4% cases ,next common was Splenomegaly which constituted about 28.5%), Ascites(25.7%), Pleural Effusion(14.2%) .In **Falguni Parakh et al study (13)** Ascites was noted in 76 patients (82.6%). A thickened GB wall was more common in patients with ascites. 40 patients (43.5%) had splenomegaly, and 70 patients (76.1%) had pleural effusion..In **Harshavardhan Nagolu et al study** (16) Ascites was the most common finding and is seen in 93.8% of patients followed by right pleural effusion in 78.7% and gall bladder wall thickening in 64.8% of patients. Left pleural effusion was seen in 64.1% patients, with all these patients showing bilateral pleural effusion. Splenomegaly and hepatomegaly were seen in 42.6% and 28.0% patients respectively. Only four patients (1.3%) had pericardial effusion. In **Sudhir Sachar** et al study (13)A thickened GB wall was more common in patients with ascites. 8 patients (40%) had splenomegaly, and 14 patients (70%) had pleural effusion. Right-sided pleural effusion was observed in 10 patients (50%), and 4 patients had bilateral pleural effusion (20%).

Conclusion

Gall bladder wall thickening is important USG finding in diagnosed cases of DF. “Honeycomb” pattern of GBWT is significant finding in severe Dengue fever.

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